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Sex-Based Differences in Cognitive Processing of  
Spatial Relations in Bilingual Students in Niger\*

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1. Introduction

During the past fifteen years a considerable body of research has emerged on the relations of sexual identity and social behavior. This concentration of research is, of course, not accidental: it stems from the growing awareness on the part of both sexes of the ways in which they are constrained to establish and maintain separate identities. Nor is it accidental that differences in language use have been a focal area in research on sex-conditioned behavior. First, it is clear that an individual's use of language is fundamental to the construction of a social identity. In large measure, we are judged to be who we are by the way we speak. In a phenomenological sense, we are inextricably our language. Furthermore, it is clear that most societies project, in some measure, different norms for male and female speech and that there is significant conformity to these norms.<sup>1</sup>

In addition, the changing paradigm within the discipline of linguistics has contributed a favorable climate for investigating sex-based differences in language use. Linguistic inquiry is no longer dominated by the Chomskian goal, the investigation of a linguistic competence that is not concerned with the inherent variation in language performance. The attention of linguists is gradually shifting from 'the ideal speaker-listener' to social speaker-listener. Linguistic competence is viewed as a social competence, a capacity for using the heterogeneous resources of language in human interaction. As Weinreich, Labov and Herzog (1968:100-101) have argued,

...nativelike command of heterogeneous structures is not a matter of multi-dialectalism or "mere" performance, but is part of unilingual linguistic competence. One of the corollaries of our approach is that in a language serving a complex (i.e., real) community, it is absence of structured heterogeneity that would be dysfunctional.

Linguists who accept this view of language are seeking to measure the degree to which non-linguistic features of the communicative situation condition the selection of linguistic features. Language is viewed as a form of social action. It is

therefore only natural that sexual identity has been consistently examined as a potential source for 'structured heterogeneity' in linguistic performance; sex differences are, after all, fundamental to the social roles we establish and maintain.

Language may vary in relation to sexual identity in two ways: it may vary according to the sex of the person(s) to whom it refers or to the sex of the person(s) who makes use of it. For example, in its referential function language may provide separate terms of address for married and unmarried females, but only a single term for these categories of males:<sup>2</sup>

FEMALE		MALE	
[+married]	[-married]	[+married]	[-married]
↓	↓	↓	↓
Mrs.	Miss	Mr.	

In this instance, language capacities themselves are asymmetrically developed in relation to sex. In contrast, symmetrical capacities may be differentially applied in reference to men and women. As Lakoff (1973) points out, one speaks of a woman scientist, but not of a man scientist. Furthermore, the woman scientist is not commonly referred to by use of the last name only, whereas the 'man scientist' is. Hence language may vary as it refers to men and women, first, as it is considered as langue, a structural resource; secondly, as it is considered as parole, a social gesture.

The popular media have been concerned with these differences in language based on the sex of the persons referred to. On the other hand, linguists, reflecting the changing paradigm of their discipline, have been concerned with variation based on the sex of those who are using language in interpersonal communication. Such differences may be reflected in the sex either of the addressor or of the addressee. For example, in certain languages like Thai the addressor is differentiated according to sex:

dichān - 'I' (female)  
phom - 'I' (male)

In other languages like Hausa, the addressee is differentiated according to sex:

kin - 'you' (female)  
kaa - 'you' (male)

Apart from these structural differences based on the sex of language users, there are many features of language that one sex chooses with greater frequency than the other. These differences of parole may be defined as "sex preferential", as opposed to the "sex-exclusive" differences of langue (Bodine 1975). These "sex preferential" patterns of speech have been primarily examined at the phonological level thus far. In general, it has been found that women tend to use formal variants of a phonological variable more frequently than men do; for example, in communicative situations

that reflect the same degree of formality females use [ŋ] more often than males do as the final consonant of words that end in -ing (Fischer 1958, Shuy et al., 1967, Labov 1972, Trudgill 1972). Apart from women's greater use of the variant [ŋ] in any particular situation, there is also a greater tendency for women to shift to [ŋ] from [n], as the communicative situation increases in formality (Shuy et al., 1967, Labov 1972). This greater propensity towards style-shifting on the part of women has been demonstrated in respect to other phonological variables such as post-vocalic /r/ and the th-variable /θ/, and /ð/ (Labov 1972).

## 2. Present study

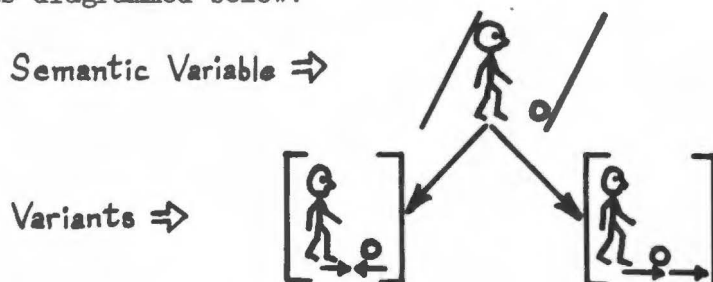
In this paper I would like to report some research concerned with a semantic variable that supports the greater propensity of females to 'style-shifting'. As far as I know, a semantic variable has not been used to study style-shifting propensities among males and females. Shifting at this level is, of course, difficult to measure, since it involved processes that cannot be directly observed, as in the case of differences at the phonological level or, for that matter, at the syntactic level.<sup>3</sup> However, if phenomenological configurations, such as those involving space and time, are carefully controlled in an experimental situation, differences in linguistic responses (or in non-linguistic responses linguistically-conditioned) to these configurations may be used to infer underlying differences in the cognitive universe of the respondent. Consider, for example, the following simple task: a person is asked to touch the front of a ball, an object lacking an intrinsic front.<sup>4</sup> If the person touches the nearer side of the ball, a cognitive universe may be inferred in which non-fronted objects face in towards ego:



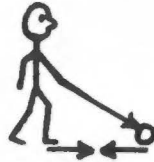
If the person touches the far side of the ball, a cognitive universe may be inferred in which non-fronted objects face away from ego:



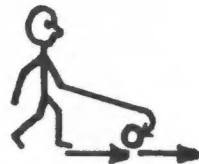
Hence for this semantic variable two variants may be identified, as diagrammed below:



In order to use this semantic variable as a measure of cognitive style-shifting, it is, of course, necessary to observe the behavior of a group of individuals who have access to each variant. In general, a monolingual person will have behavioral access to only one of the variants, though patterns of cognitive development may have provided exposure to each. For example, the linguistic behavior of an English-speaking or French-speaking individual would normally reflect the

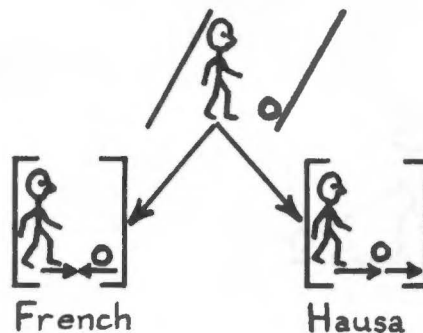


variant (Harris and Strommen 1972, Kuczaj and Maratsos 1974), whereas the normative behavior of a Hausa-speaking or Djerma-speaking person would reflect the



variant (Hill 1975).<sup>5</sup> However, a Hausa-French bilingual would have access, at least potentially, to each variant. It might be hypothesized that such a person would appropriately map each variant according to the following model:

### MODEL I:



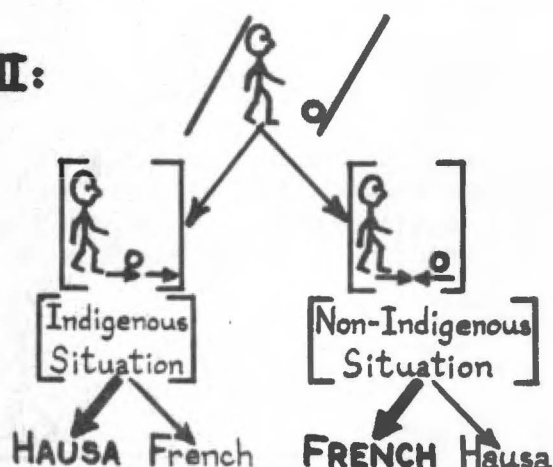
This model, however, assumes a static notion of cognito-linguistic competence, one in which the 'ideal [bilingual] speaker-listener' neatly matches internal strategy to external response.

The performance of bilingual individuals may not, however, be explained by such a neat model. It is evident that certain features of phonology, syntax, and the lexicon belonging to one language are often transferred to the other in the actual performance of a bilingual individual. Many of these transfers appear to be related to factors in the communicative situation that induce code-switching. Hence it might be hypothesized that a Hausa-French bilingual would use the



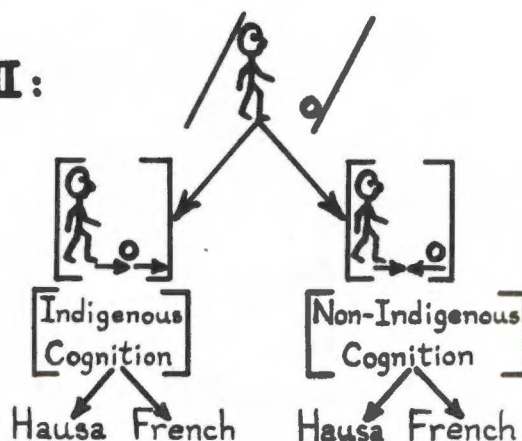
strategy in responding in Hausa, if it were elicited by non-indigenous factors in the communicative situation. The following model would account for this kind of cognitive style-shifting:

## MODEL II:



As indicated by the double arrow and capitalization, Hausa would be the language normally used in communicative settings which may be characterized as indigenous, French the language used in settings which may be characterized as non-indigenous.

A third model might be constructed which would account for a more permanent kind of cognitive shifting, one not necessarily responsive to external features in the communicative situation. According to this model, a single strategy would be stabilized in the cognitive universe of each bilingual person; it would then be mapped onto all responses in each of the languages, irrespective of the communicative situation. In effect, any given Hausa-French bilingual would have behavioral access to only one of the two strategies:

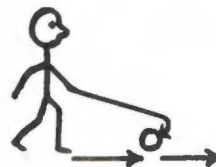
**MODEL III:**

The stabilization of a non-indigenous strategy by a native speaker of Hausa would presumably reflect a wider pattern of cognitive acculturation to non-indigenous norms.

In order to test the validity of these various models, 346 bilingual students in Niamey, Niger were presented a series of tasks in which they were forced to choose between the



strategy and the

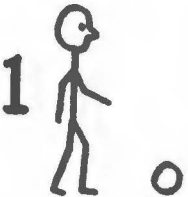





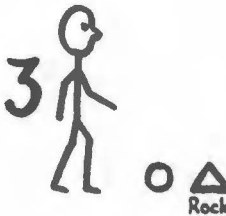


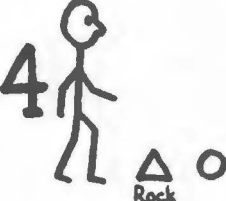




one in responding to their native language, Hausa or Djerma. They were participating in a model school that had been organized for training teachers of English in Niger. The students ranged from 10 to 20 in age and from classe sixième to classe première in school (seventh grade to twelfth grade in the American system). Before entering classe sixième, all had attended six years of primary school in which lessons had been conducted in French. Since French was also the sole language of instruction at the secondary level of education, it was hypothesized that non-indigenous cognitive styles might be used to a significant degree in solving tasks in school, even though the students were required to use their native language in processing the tasks. Hence a communicative situation was designed in which the following factors could contribute to the use of a non-indigenous strategy:

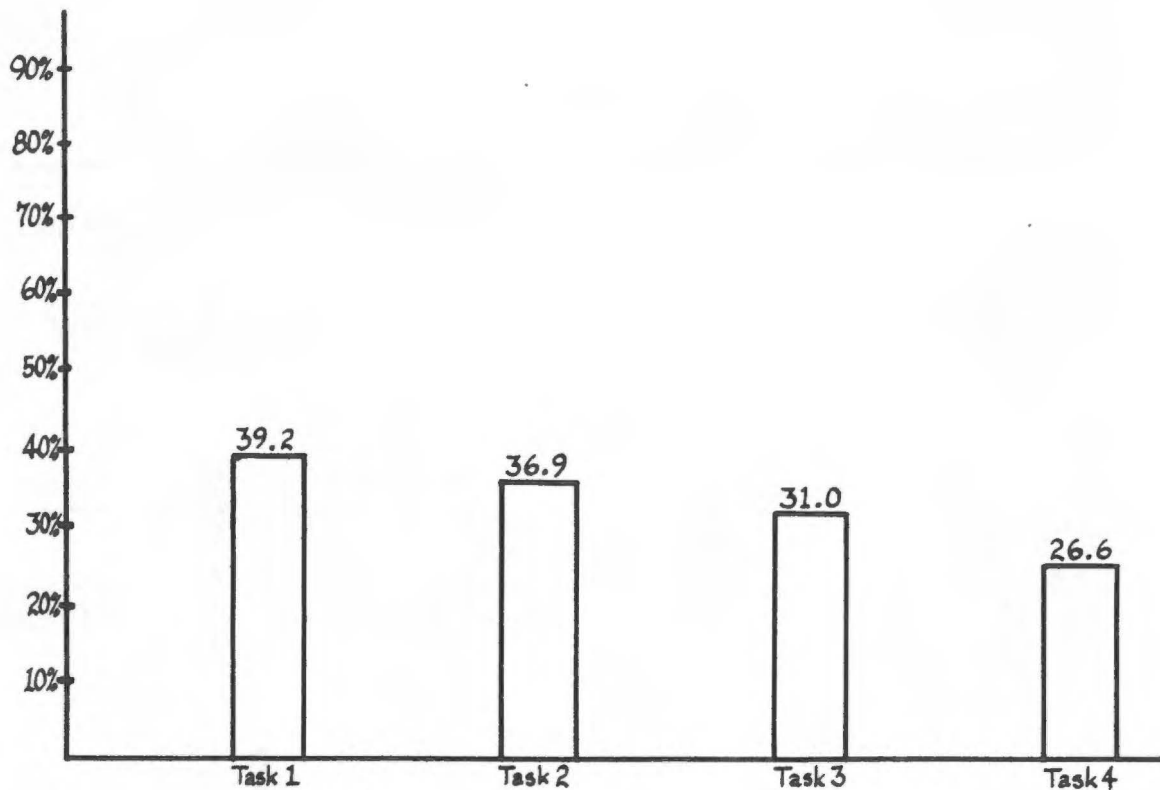
- 1) setting (a Western-style school);
- 2) task (problem-solving);
- 3) discourse frame (a test-like situation, a linear processing of items);
- 4) mood (relatively formal);
- 5) audience (predominantly educated Nigerians and Americans; interlocutor was, however, a relatively uneducated Nigerian).



Although a number of tasks were presented in random order to the students (some involving objects with an intrinsic front-back), only the results of the following four will be reported in this study:

REAL-WORLD CONFIGURATION	LINGUISTIC STIMULUS	RESULTS
1 	"Touch the back of the ball."	Normative Hausa response:  60.8% Normative French response:  39.2%
2 	"Touch the front of the ball."	Normative Hausa response:  63.1% Normative French response:  36.9%
3 	"Is the rock in front or in back of the ball?"	Normative Hausa response:  69.0% Normative French response:  31.0%
4 	"Is the rock in front or in back of the ball?"	Normative Hausa response:  73.4% Normative French response:  26.6%

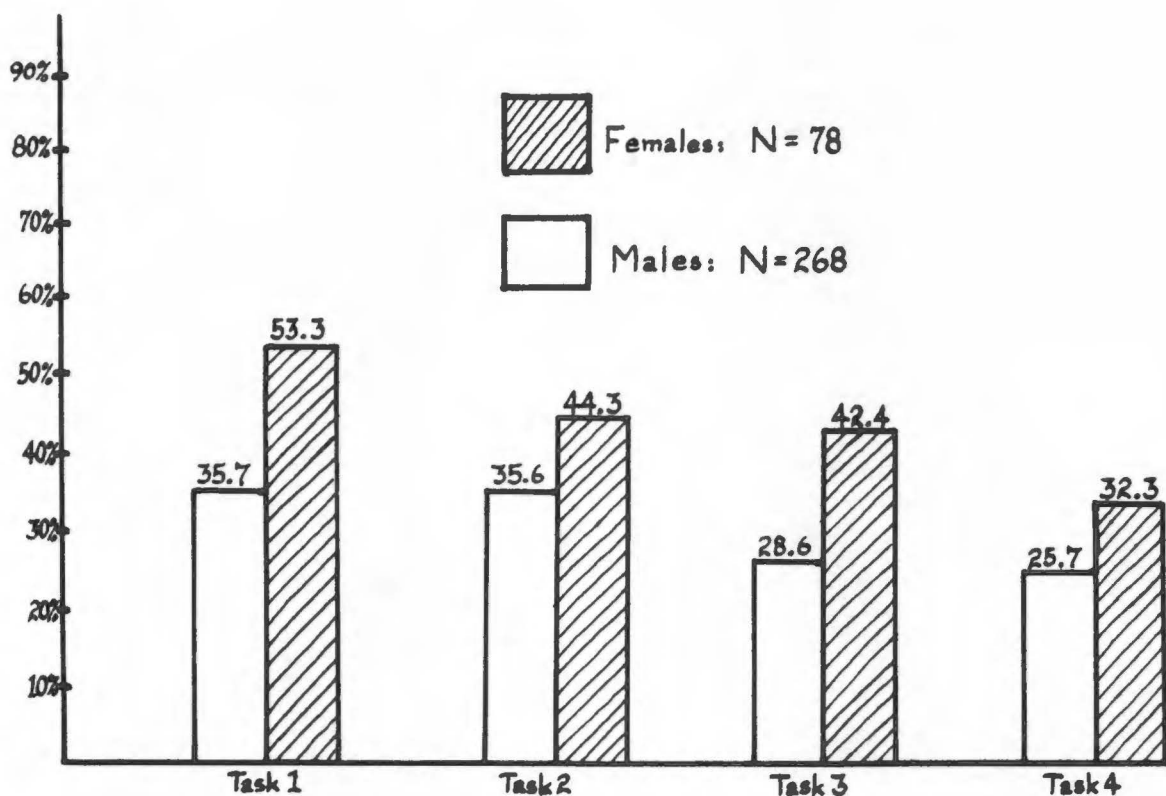
The percentage of students shifting to a non-indigenous pattern on each of the four tasks is summarized in the following graph:



It will be noted that more cognitive style-shifting occurs in response to the task with a single object than to the one with two objects. It is as though the presence of the second object contributes to the preservation of the indigenous strategy, the one in which the object serving as reference point is assumed to be facing away from ego. As an educated Hausa informant put it, 'the objects may be seen as racing to infinity.'<sup>6</sup>

Among the students participating in the study 268 were male, 78 female. This proportion of female students is somewhat high for Niger, a country with strongly Muslim traditions that do not encourage the participation of women in public domains. However, as we set up the model school for training teachers, we deliberately recruited a large number of girls from the local schools. Let us now compare the proportion of girls and boys who made use of a non-indigenous strategy on each of the four tasks: ( $p < .01$ )





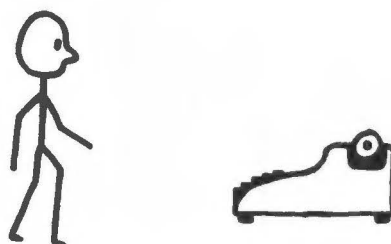
### 3. Conclusions

As mentioned earlier, the number of girls in secondary schools in Niger is sharply limited by the traditional expectation that female participation in public domains should be restricted. In effect, this restriction means that the girls who do attend a secondary school largely come from sectors of society that have been acculturated to non-indigenous norms. Although the same processes of selection operate in respect to boys, they are much less dominant. The boys who enter a secondary school in Niger reflect a wider socioeconomic background; they are not so concentrated in the particular sector of society that reflects western values.

Initial efforts were made to collect information on the socioeconomic background of all the students so that cognitive style-shifting of girls and boys from the same sectors of society might be compared. However, the collected information was particularly difficult to codify; for example, the different kinds of parental occupation could not be plotted on a western scale of measurement and no local scales were available.<sup>8</sup>

In the absence of such a comparison it can only be hypothesized that girls, irrespective of socioeconomic background, reflect a greater tendency to make use of a non-indigenous strategy than do boys in secondary schools in Niger.<sup>9</sup> In addition, the question that was raised by the construction of Models II and III remains: is the cognitive shifting to a non-indigenous strategy elicited by features in the communicative situation or is it a more permanent kind of readjustment within the cognitive universe of the individual?<sup>10</sup>

If the latter model is chosen as the more accurate one, it may be that we are observing the early stages of a semantic change within Hausa and Djerma, as they are spoken by the educated classes. Such a change would, of course, be motivated by a persistent use of French in daily experience; in addition, the patterns of phenomenological experience of educated individuals would reinforce it. Their world increasingly provides experience of person-object patterns of interaction wherein the object 'faces in' to ego. Consider, for example, the interaction of a person with a typewriter:



The person faces the object; the object faces the person. This face-to-face pattern is built into the person-machine processing of information and hence simulates the norms of social interaction. As a consequence of the persistent pattern of person-machine interaction in a technological society, the face-to-face norm is possibly projected onto all objects, even those lacking an intrinsic front-back. In a world that presents a frequent pattern of face-to-face interaction with machine-like objects, it becomes more efficient to assume that all objects are facing in towards ego.<sup>11</sup>

If such a semantic change is taking place among educated speakers of Hausa and Djerma, it is of particular interest that it is more concentrated among female students than male students in secondary schools in Niger. It has been observed in a number of studies that women are in advance of men in processes of change within a linguistic system. Hitherto, such observations have been made primarily at the phonological level (Gauchat 1905, Shuy, Wolfram, and Riley 1967, Labov, Yaeger, and Steiner 1972). For example, in the last study it was found that women are nearly an entire generation ahead of men in the raising of /eh/ in the speech community of New York City. The results of the study of bilingual students in Niger may provide evidence that females are in advance of males in linguistic change at the semantic level of language as well as at the phonological.

As Labov (1972:302-303) has pointed out, the fact that women tend to be in advance of men

...must play an important part in the mechanisms of linguistic change. To the extent that parents influence children's early language, women do so even more; certainly women talk to young children more than men do, and have a more direct influence during the years when children are forming linguistic rules with the greatest speed and efficiency. It seems likely that the rate of advance and direction of a linguistic change owes a great deal to the special sensitivity of women to the whole process.

In conclusion, the study shows that the female students tested in secondary schools in Niger shifted to the non-indigenous strategy with significantly greater frequency than male students. However, the proper interpretation of such cognitive shifting awaits further research to determine whether female bilingual students in Niger make use of the



variant more than male even if (1) they are from the same sectors of society; (2) they are responding naturistically in communicative situations that reflect indigenous values. It should be stressed, however, that the current research, in and of itself, demonstrates the feasibility of using a semantic variable in measuring 'structured heterogeneity' in linguistic performance.

#### Footnotes

\*I would like to thank the following persons who helped in the study: Mohammadou Yacouba who spent long hours conducting the interviews; Bob Vivolo, Sue Rasmussen, and all other Peace Corps volunteers who helped execute the project; and the Nigerien students at the lycée kasai who participated so willingly in the experiment.

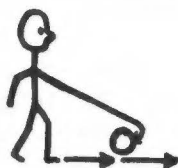
<sup>1</sup>The distinction between social norms and actual behavior is an important one. For example, it has been shown that the popular stereotypes of male and female speech, as exemplified in cartoons, movies, novels, etiquette books, etc., often do not reflect accurately the way people really talk, even in those situations most conducive to the realization of the stereotypes (Kramer 1974; Hirschman 1974).

<sup>2</sup>Even with the creation and use of the term 'Ms.', the imbalance remains; 'Miss' and 'Mrs.' remain in use, and no set of equivalent terms are used to distinguish unmarried and married men.

<sup>3</sup>A number of morphological and syntactic patterns have been identified as more frequent in women's speech than men's: psychological state verbs (Barron 1971); expressive intensifiers like so or such and tag questions (Lakoff 1973); the use of conjunctions rather than interjections to mark topic shifts (Swacker 1975), etc. In general, however, such variables have not been systematically used in controlled observation of men's and women's speech.

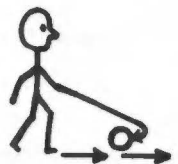
<sup>4</sup>It is assumed that the person and the ball are in an environment in which field-dependency has been neutralized, e.g., they are not located in any spatial field that possesses an intrinsic front-back axis, etc.

<sup>5</sup>The issue of normative behavior is fraught with difficulty, particularly in areas of cross-cultural research. For example, experimental measurement of cognitive norms in non-western cultural settings is highly problematical, since the experimental situation itself may be alien to the culture (Cole, Gay, Glick and Sharp 1971). However, naturalistic observation of the use of language in the Hausa speech community provides strong evidence that the

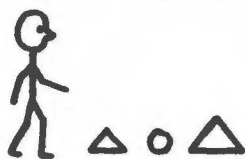


variant is the norm.

<sup>6</sup>It is of interest that native speakers of English seem to make greater use of the

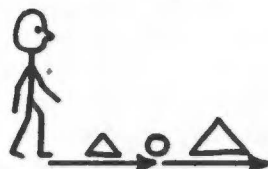


strategy when confronted with the following task:



Which rock is in front of the ball?

A certain number will answer the 'big one', reflecting a strategy that assumes the ball is facing away:



It is as though the multiplicity of objects sets up dynamic motion in the same direction ego is facing. This same dynamic is reflected in certain linguistic structures used in the processing of temporal relations, such as 'in the months ahead'. As Fillmore (1972 ms.)

is careful to point out, the opposite dynamic is reflected in a pattern such as 'in the following months'.

<sup>7</sup>It is of interest to observe female-male differences in response to other tasks such as the following:



Is Dogon Douchi in front or in back of Maradi? (in Hausa gaba and baya, the basic terms for 'front' and 'back', are used in defining relations between points in geographical space)

54.2% of the females made use of the non-indigenous variant



answering that Dogon Douchi is in 'front'. Only 29.8% of the boys made use of the non-indigenous strategy.

<sup>8</sup>Ideally, a study of social attitudes within Niger toward occupational differences would have been made in order to construct a local scale; unfortunately, time did not permit such a study.

<sup>9</sup>Hopefully, such a hypothesis will be tested in the coming year in northern Nigeria where socioeconomic data will be more easily obtainable.

<sup>10</sup>Certain students reported in formal conversation that they use the same strategy, irrespective of which language they are speaking. But they disagreed amongst themselves as to which is the common strategy. For example, one Djerma girl raised by American missionaries used the indigenous strategy in responding to the tasks in English and French, as well as in Djerma. However, a Nigerien *metisse* used the non-indigenous strategy in responding in Djerma as well as in French. There was some pilot testing of responses to the same tasks in French; the results were inconclusive, but they suggested that use of the non-indigenous variant increases significantly. The research planned in northern Nigeria will involve systematic testing of responses in English as well as in Hausa. The results of that research should help in determining whether Model II or Model III is the more accurate one.

<sup>11</sup>Careful observation was made of the kinds of indigenously made objects used in daily life in traditional homes in Niger. It was discovered that there is virtually a complete absence of objects with an intrinsic front-back axis, at least in a horizontal plane. Some informants would describe the top of objects such as a carved calabash as the gaba 'front', the bottom as the baya 'back'. However, there were no indigenous class of fronted objects which would be functionally equivalent to that of typewriters, telephones, radios, etc.

# References

- Barron, N. 1971. Sex-typed language: the production of grammatical cases. *Acta Sociologica* 14:24-72.
- Bodine, A. 1975. Sex differentiation in language. In B. Thorne and N. Henley (eds.), *Language and sex: difference and Dominance*. Rowley, Mass.: Newbury House.
- Cole, Michael and Johy Gay, Joseph Glick and Donald Sharp. 1971. *The Cultural Context of Learning and Thinking*. New York: Basic Books.
- Fillmore, Charles. 1972. *Time*. Unpublished manuscript.
- Fischer, J. L. 1958. Social influence on the choice of a linguistic variant. *Word* 14:47-56.
- Gauchat, L. 1905. L'Unité phonétique dans le patois d'une commune. *Aus Romanischen Sprachen and Literaturen: Festschrift Heinrich Mort*. Halle: Max Niemeyer.
- Harris, L. and E. Strommen. 1972. The role of front-back features in children's 'front', 'back', and 'beside' placements of objects. *Merrill-Palmer Quarterly* 18:259-271.
- Hill, Clifford A. 1975. Variation in the use of 'front' and 'back' by bilingual speakers. In *Proceedings of the First Annual Meeting of the Berkeley Linguistics Society*.
- Hirschman, L. 1974. Analysis of supportive and assertive behavior in conversations. Paper presented at Linguistic Society of America.
- Kramer, C. 1974. Women's speech: separate but unequal. *Quarterly Journal of Speech* 60:14-24.
- Kuczaj, S. A. and M. P. Maratsos. 1974. Front, back and side: stages of acquisition. *Papers and Reports on Child Language Development* 8.
- Labov, W. 1972. *Sociolinguistic Patterns*. Philadelphia: Univ. of Pennsylvania Press.
- \_\_\_\_\_, M. Yaeger, and R. Steiner. 1972. *A Quantitative Study of Sound Change in Progress*. Final report on National Science Foundation contract NSF-GS-3287.
- Lakoff, Robin. 1973. Language and woman's place. *Language in Society* 2:45-79.
- Shuy, R., W. Wolfram, and W. K. Riley. 1967. *A study of social Dialects in Detroit*. Final report, Project 6-1347. Washington, D.C.: U.S. Office of Education.
- Swacker, M. 1975. The sex of the speaker as a sociolinguistic variable. In B. Thorne and N. Henley (eds.), *Language and sex: Difference and Dominance*. Rowley, Mass.: Newbury House.
- Trudgill, P. 1972. Sex, covert prestige, and linguistic change in the urban British English of Norwich. *Language in Society* 1:179-195.
- Weinrich, U., W. Labov, and M. Herzog. 1968. Empirical foundations for a theory of language change. In W. P. Lehmann and Y. Malkiel (eds.), *Directions for Historical Linguistics*. Austin: University of Texas Press.